

What is claimed is:

1. A micro-pump comprising:

a pumping chamber having a predetermined inner space to be filled with a fluid;

at least one fluid entrance and at least one fluid exit, which are connected to the pumping chamber;

a heating element provided at one side of the pumping chamber to generate bubbles in the pumping chamber by heating the fluid; and

electrodes for applying current to the heating element,

wherein the fluid is made to flow into or out of the pumping chamber by expansion and contraction of the bubbles, and wherein a cross-sectional area of at least one of the fluid entrance and the fluid exit varies along a direction in which the fluid flows.
2. The micro-pump as claimed in claim 1, wherein the cross-sectional area of the fluid entrance decreases in a direction toward the pumping chamber, and the cross-sectional area of the fluid exit increases in a direction toward the pumping chamber.
3. The micro-pump as claimed in claim 2, wherein the fluid entrance and the fluid exit are formed to have an inclination angle of at least

about 50°.

4. The micro-pump as claimed in claim 1, wherein the cross-sectional area of the fluid entrance increases in a direction toward the pumping chamber, and the cross-sectional area of the fluid exit decreases in a direction toward the pumping chamber.

5. The micro-pump as claimed in claim 4, wherein the fluid entrance and the fluid exit are formed to have an inclination angle of about 30° or less.

6. The micro-pump as claimed in claim 1, wherein the fluid entrance is provided at one side of the pumping chamber and the fluid exit is provided at an opposite side of the pumping chamber to face the fluid entrance.

7. The micro-pump as claimed in claim 1, wherein the fluid entrance and the fluid exit each have a pyramid shape.

8. The micro-pump as claimed in claim 1, wherein the fluid entrance and the fluid exit each have a uniform height and a width that

varies in a direction in which the fluid flows.

9. The micro-pump as claimed in claim 1, wherein the pumping chamber and the heating element each have a rectangular shape.

10. The micro-pump as claimed in claim 1, wherein the pumping chamber and the heating element each have a circular shape.

11. The micro-pump as claimed in claim 1, wherein the heating element is formed of a resistive heating material.

12. The micro-pump as claimed in claim 1, further comprising a substrate in which the pumping chamber, the fluid entrance, and the fluid exit are formed.

13. The micro-pump as claimed in claim 12, further comprising an insulation layer formed on the substrate, wherein the insulation layer constitutes an upper wall of the pumping chamber, and the heating element and the electrodes are formed on the insulation layer.

14. The micro-pump as claimed in claim 13, further comprising a passivation layer having insulation characteristics formed on the heating element and the electrodes.

15. The micro-pump as claimed in claim 14, further comprising a heat dissipation layer formed on the passivation layer for dissipating heat, wherein the heat dissipation layer is connected to the substrate.

16. The micro-pump as claimed in claim 15, wherein the heat dissipation layer is formed of a metal.